SAWYER BEACH

Water Quality Report
Summer 2008

New Hampshire Department of Environmental Services

NH Department of Environmental Services

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Sawyer Beach, Rye
Water Quality Report
Summer 2008

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History of the Beach Program

The New Hampshire Department of Environmental Services (DES) recognizes a public health threat may exist within recreational waters and tests the water at the state's beaches to ensure swimmers are not exposed to disease-causing pathogens or cyanobacteria scums. The DES has operated a Public Beach Inspection Program, commonly called the Beach Program, for over 20 years.

The New Hampshire coastal beach monitoring program was initiated in 1989 with the DES inspecting five beaches. In October 2000, the United States Congress amended the Clean Water Act to include the BEACH Act. The Environmental Protection Agency (EPA) could now was now authorized to award grants to eligible states to develop and implement monitoring and notification programs. These programs protect the public from exposure to pathogenic microorganisms in coastal recreation waters.

The DES first received grant funds in 2002. Since then the New Hampshire Beach Program has successfully met all of EPA's performance criteria requirements (*National Beach Guidance and Required Performance Criteria for Grants*) and continues to expand the monitoring and notification program. Weekly summer monitoring throughout the state was conducted at nine beaches in 2002, and has since doubled to 16 by 2008. The Beach program strives to expand sampling to include all coastal New Hampshire beaches.

Coastal beaches are monitored for the presence of the fecal bacteria *Enterococci* which are present in the intestines of warm-blooded animals including humans. Fecal bacteria, when present in high concentrations and ingested, can commonly cause gastrointestinal illnesses such as nausea, vomiting and diarrhea. These indicator organisms signify the possible presence of other potentially disease-causing organisms in the waterbody.

Beach monitoring and bacteria source tracking have been implemented to protect public health. In a collaborative effort, the DES Beach program, towns, beach managers, recreational directors and health inspectors encourage public awareness of sources of pollution and environmental responsibilities. Thank you for your interest and concern in New Hampshire's water quality.

Beach Statistics

Sawyer Beach is owned and maintained by the town of Rye. It is located on Route 1A, just north of the Rye/North Hampton border. The beach season runs from June 1 to October 1. During the season, beach use is allowed between sunrise and midnight.

Sawyer Beach is a 1,261-foot long sandy beach. The beach is used by the public for swimming, walking, and surfing, among other recreational activities. There are three access points to the beach area from the parking area along Route 1A (Figure 1). Lifeguards are present throughout the summer but toilet facilities are not available.

Waterfowl are frequently observed at the beach; the most commonly observed are gulls and plovers. Large flocks of gulls typically congregate at the northern end of the beach by the discharge from Eel Pond. The town of Rye restricts dogs at Sawyer Beach from 8:00 A.M. to 6:00 P.M. during the beach season.

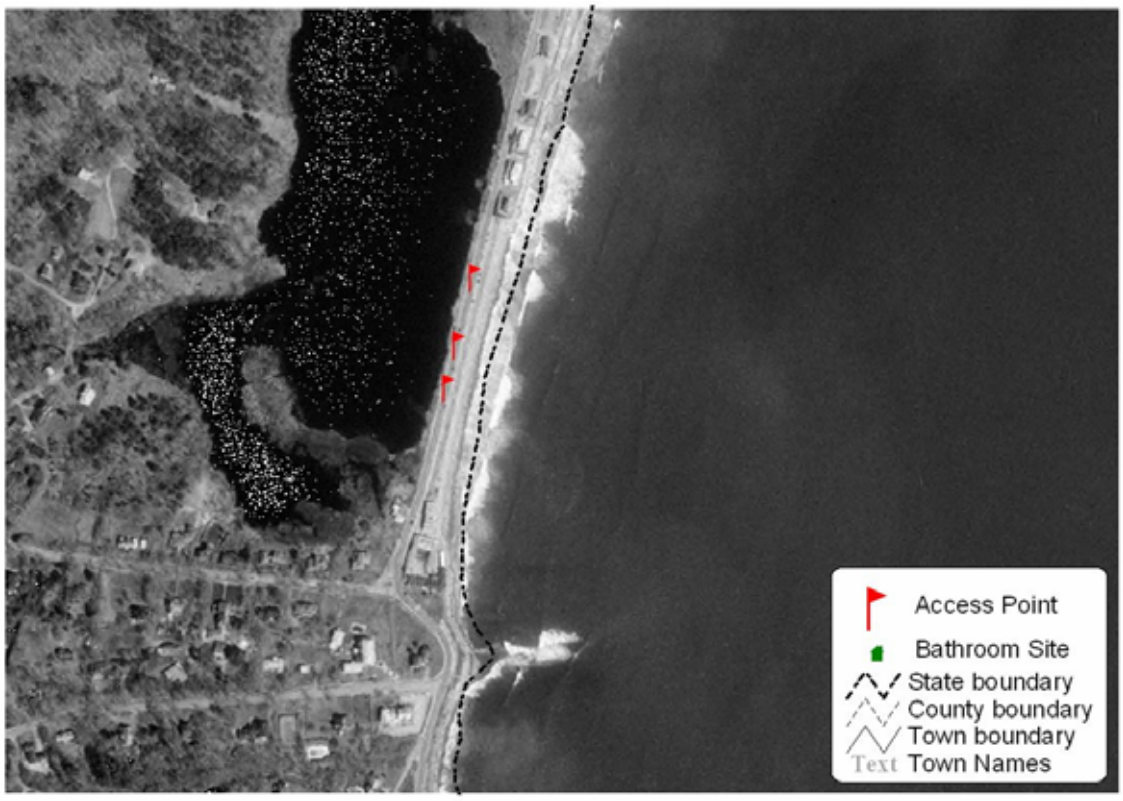

Figure 1. Sawyer Beach Access Points and Restroom Facilities.

Assessing Your Beach

Sampling Frequency and Location

The Beach Program developed a risk-based beach evaluation process and tiered monitoring approach during the 2003 beach season based on the EPA performance criteria. Beaches are evaluated annually to determine potential health threats to the public. Evaluations are based on several criteria within three main categories: beach history, microbial pathogen sources, and beach use. Beaches are now assessed as impaired for bacteria based on the most recent version of the Consolidated Assessment and Listing Methodology (CALM). The CALM assesses beach units as impaired based on historical exceedances of both the single sample and geometric mean bacteria standards. This report is submitted to EPA every two years.

Based on the evaluations, beaches are assigned a Tier I, Tier II, or Tier III status. Tier I beaches are considered “high priority” and have an increased potential to affect public health. Tier II beaches are “medium priority” and Tier III are “low priority” beaches that have less potential to affect public health. Beach sample frequency is based on Tier status; Tier I beaches are sampled twice per week, Tier II beaches are sampled once per week, and Tier III beaches are sampled every other week.

The number of samples collected at each beach is determined by the beach length. Beaches less than 100 feet in length are sampled at left and right locations one-third of the distance from either end of the beach. Beaches greater than 100 feet in length are bracketed into thirds and sampled at left, center and right locations. Routine sample collection may be enhanced by sampling known or suspected pollution sources to the beach area. Storm event sampling may be conducted at beaches where watershed runoff resulting from rainfall is expected to impact beach water quality.

Sawyer Beach is a Tier I beach indicating high priority, necessitating sampling twice each week. The frequency of sampling at the beach has changed since the launch of the beach evaluation process implemented in the 2003 sampling season. Sawyer Beach increased from being sampled once a week to being sampled twice a week in 2006 due to potential pollution sources that may pose a threat to bathers.

At Sawyer Beach, samples are collected at the left, center, and right stations regularly (Table 1). All stations are evenly distributed along the shoreline (Figure 2) and can be accessed via the parking area (Figure 1). Additional samples were also collected from the Eel Pond discharge, located at the northern end of Sawyer Beach (Table 1).

Table 1. Sawyer Beach Station Descriptions and Latitude/Longitude Points.

Station Description	Latitude	Longitude
Left Sample Station: Located straight in front of the northern ramp entrance to the beach, not far from the Eel Pond outlet.	42° 58’ 51.7557”	-70° 45’ 50.2860”
Center Sample Station: Located straight in front of the main beach entrance and lifeguard tower.	42° 58’ 49.1665”	-70° 45’ 51.3064”
Right Sample Station: Located straight in front of the southern ramp entrance to the beach.	42° 58’ 46.4040”	-70° 45’ 52.5234”
Eel Pond Sample: Located where the culvert discharges to the beach area.	42° 58’ 41.8600”	-70° 45’ 53.7900”

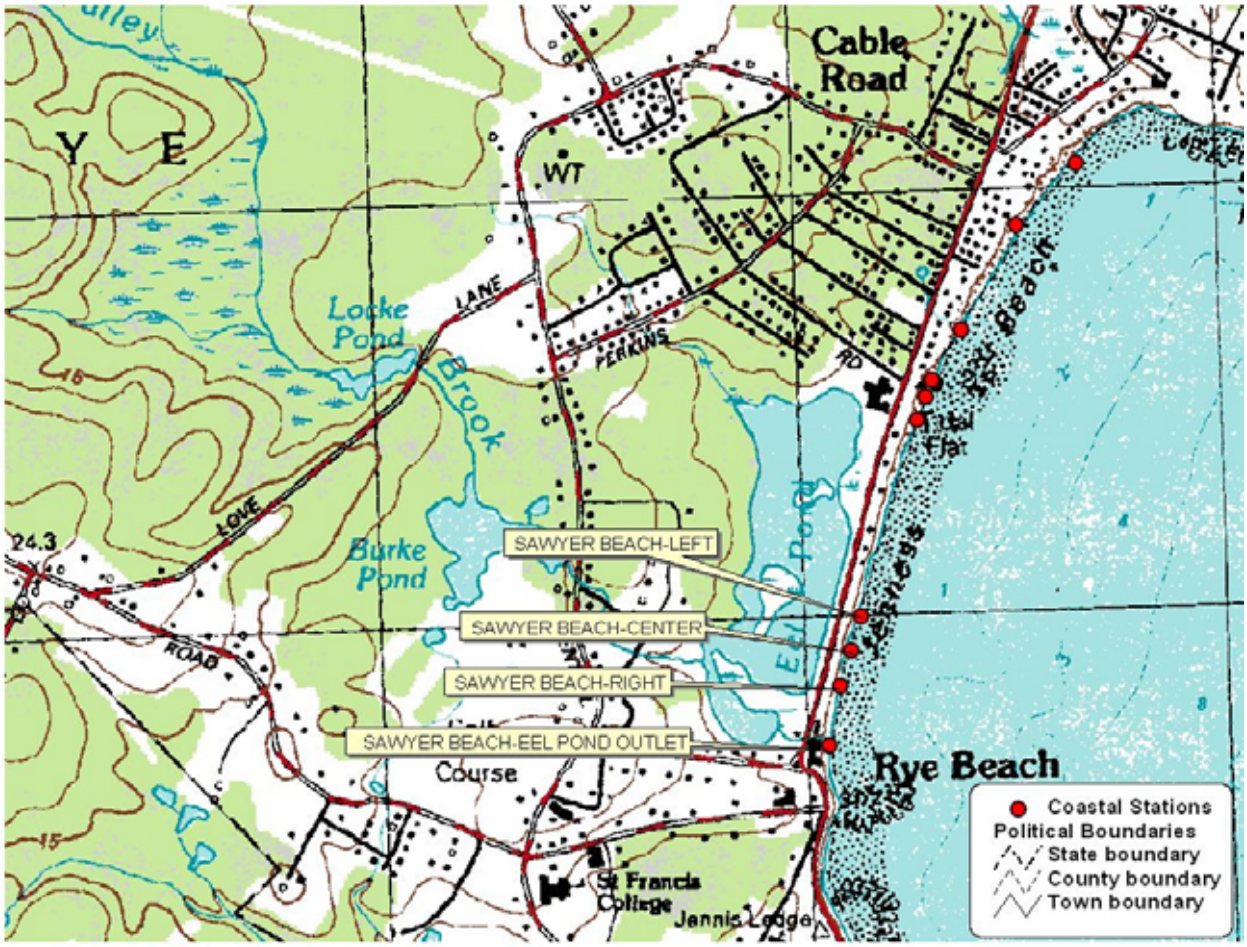

Figure 2. Sawyer Beach Monitoring Stations.

Coastal Water Quality Standards and 2008 Results

Beaches are monitored to ensure compliance with State water quality standards. Marine waters are analyzed for the presence of the fecal bacteria Enterococci. Enterococci are known as indicator organisms, meaning their presence may indicate the presence of other pathogenic organisms. The State standard for Enterococci at public beaches is 104 counts/100 mL water in one sample, or a geometric mean of 35 counts/100 mL in at least three samples collected over sixty days. When samples exceed the standard, a beach advisory is issued, at which point the beach manager is notified and signs are placed at the entrances to the beach to warn the public of the potential health threat posed by water contact at the beach. Beach advisories remain in effect until subsequent beach sampling indicates safe water quality conditions.

The 2008 sampling season began May 27th. The sampling season encompassed 96 days. Precipitation was recorded on 42 days over the summer (based on precipitation recorded at the Pease Air National Guard weather station). June wetfall totaled 5.79 inches while July and August yielded 8.86 and 2.6 inches of rain respectively.

At Sawyer Beach, 31 routine inspections were conducted in 2008. Ninety-three samples were collected and tested for Enterococci (Appendix B). Overall, the 2008 summer Enterococci levels were very low and within the State's standards for Sawyer Beach (Figure 3), with no advisories issued.

Sawyer Beach Adopt-a-Beach Program

In response to growing concern over the amount of litter and marine debris impacting visual and environmental aspects of New Hampshire's beaches, the Beach Program partnered with the Blue Ocean Society for Marine Protection from Portsmouth, N.H. Both parties met in the spring of 2005 to discuss the development of an Adopt-a-Beach Program. The Blue Ocean Society agreed to add Sawyer Beach to their Adopt-a-Beach Program and the Beach Program agreed to supply all necessary materials for adopting the beach.

Volunteers conduct beach clean-ups about once per month and record items found on data cards. The litter is discarded into trash bags and weighed at the end of the clean up. The items recorded on data cards are tallied and sent to the Blue Ocean Society where the numbers are entered into spreadsheets and summarized for the year. Twelve clean-ups were conducted at Sawyer Beach in 2008. The most numerous items found were rope, cigarette butts, and bottle caps. The combined weight of trash collected was 215 pounds.

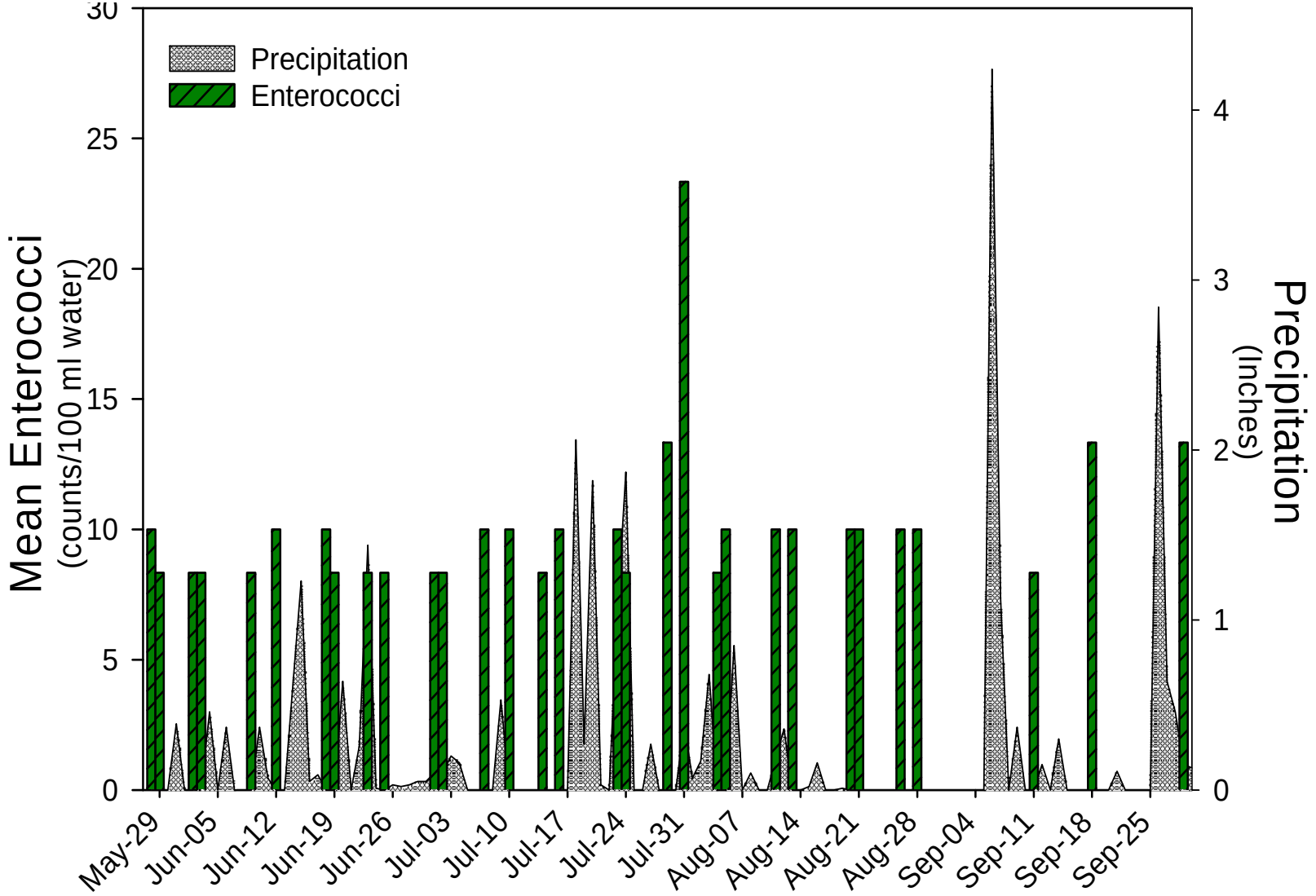

Figure 3. Sawyer Beach 2008 Enterococci Data. Enterococci values are the mean of three collected beach samples . No advisories were posted at Sawyer Beach during the summer of 2008 for violations of the state standard of 104 counts/100 ml of water. The elevated rainfall in July and September did not lead to increased bacteria values. See Appendix B for all results from all stations for the 2008 sampling season.

Concerns

The discharge from Eel Pond is a cause for concern at Sawyer Beach. Eel Pond supports several waterfowl populations, including ducks, geese, and swans. The fecal wastes from these waterfowl contain bacteria that likely contaminate the Sawyer Beach area when the pond discharges to the beach. The warmer discharge water from the Eel pond outlet flowing across Sawyer Beach attracts large numbers of gulls that defecate on the beach and contribute to the bacteria load.

Young children were observed playing in the Eel Pond discharge on several occasions this summer. Children are more susceptible to waterborne illnesses and must be discouraged from contacting the Eel Pond discharge to decrease any potential health risk.

The Beach Inspector discovered two dead seals on Sawyer Beach at the end of September. Beach Program personnel reported the animals to the New England Aquarium. The DES Beach Program staff will be meeting with the NEA and others in early 2009 to determine a protocol for stranded marine mammals. Beach managers will be informed of any relevant issues.

Future Projects

- High bacteria levels are frequently measured in the discharge from Eel Pond that flows across Sawyer Beach, but children enjoy playing in the warmer water. Rye town officials should consider erecting a sign near the Eel Pond outlet that warns the public of the health risk associated with high bacteria levels. DES can provide signs if town officials are interested.

- The DES Beach Program encourages participation between the town of Rye, local businesses, or school groups and the Adopt-a-Beach Program. The program promotes beach clean-ups and water quality monitoring. The DES would conduct training sessions and participate in education and outreach activities for the community.

If you are interested in either Adopt-a-Beach or beach signage, please contact Sonya Carlson at (603) 271-0698 or sonya.carlson@des.nh.gov.

Appendix A: 2008 Special Report – Stormwater Modeling

When rain falls over the land, it flushes bacteria and other contaminants that have accumulated on the landscape to our beaches. As impervious areas like pavement and buildings are constructed in a subwatershed, more runoff contaminants are carried to our beaches. In addition to increased impervious cover as a result of land use changes, New Hampshire has recently experienced substantial and prolonged wetfall events. With increased flushing of the landscape combined with expanded impervious cover, it is imperative for local and state governments to explore new management techniques to protect New Hampshire beaches from contaminant sources.

DES Beach Program monitors New Hampshire coastal waters for potentially pathogenic bacteria. The DES has been monitoring these beaches since 1989 and has amassed large amounts of bacterial information for most coastal beaches. This collected information over the past years can be used to predict bacteria counts that can be expected with present and future development.

The DES Beach Program is proactive and always researching new management practices that can improve beach quality and new techniques to accelerate the beach advisory notification process. Beach Program personnel sample coastal beaches 4 days a week. Advisories are issued once state bacteria standards are exceeded. Despite our protective efforts, at least 24 hours pass from sample collection to bacteria count determination. During this time DES and swimmers are unaware of bacteria levels. The period of time between monitoring and sample analyses certainly put swimmers at risk for potential illness.

Two important Beach Program goals are to determine watershed contribution of bacteria to coastal beaches and to predict bacterial concentrations during and after a rain event. Mathematical models can be used to ascertain categories of bacteria sources and to predict bacteria concentrations after a rain event. Such models are complex and require a great deal of expertise and technical skill. The DES has selected FB Environmental to utilize an appropriate model and to train Beach Program personnel how to apply the model. With detailed predictions of how wetfall will affect bacteria transport to coastal beaches, future buildout planning, mediation, and construction could be guided by a stormwater model. The DES hopes the model will provide a useful tool for town officials and law makers to improve public notification and protect public health.

With the ability to predict public beach bacterial concentrations DES could immediately post an advisory based on predicted values and conduct follow up sampling for verification. A predictive model would allow advisories to be posted as soon as a public health threat occurs. Collecting samples during times of predicted high bacteria levels will help DES verify the accuracy and precision of the model. A model can be an effective tool in helping us achieve our mission to protect the public from exposure to waterborne illness while enjoying New Hampshire waters.

In addition to coastal bacteria data, the model will incorporate land use categories, hydrology, topography, historical precipitation records, historical tide data, and waste management. The data collection effort for this project has been time consuming and required help from several sources outside the DES. The DES would like to thank the National Oceanic and Atmospheric Association, the National Climatic Data Center, the Seabrook Nuclear Power Station and the Pease Air National Guard Base Weather Station for providing data. The model is only as good as the data we input, so we strive for the best quality controlled verified data available. The project is due for completion in early 2009.

Appendix B: Sawyer Beach 2008 Data by Date

Date	Enterococci (count/100 mL)				Tide Height (feet)	Rainfall in previous 24 hours (inches)	Number of bathers	Animal Presence
	Left	Center	Right	Eel Pond				
5/28/08	< 10	< 10	< 10	140	1.18	0.16	0	25 gulls
5/29/08	< 10	< 5	< 10		1.47	0	0	50 gulls
6/2/08	< 10	< 10	5		9.26	0	5	15 gulls
6/3/08	< 10	< 10	< 5		9.33	0	5	50 gulls
6/9/08	10	< 5	< 10		0.49	0	0	80 gulls
6/12/08	< 10	< 10	< 10	40	4.05	0	0	35 gulls
6/18/08	< 10	< 10	< 10	< 10	7.6	0.09	2	12 gulls
6/19/08	< 5	< 10	< 10	30	7.21	0	0	20 gulls
6/23/08	5	< 10	< 10	10	2.13	0.26	20	60 gulls
6/25/08	< 5	10	< 10	30	1.0	0.01	7	70 gulls
7/1/08	< 10	< 10	< 5		8.43	0	20	40 gulls
7/2/08	10	10	< 5		9.0	0.10	35	10 gulls
7/7/08	10	< 10	< 10	< 10	0.91	0	15	50 gulls
7/10/08	< 10	< 10	< 10	10	1.13	0.02	3	60 gulls
7/14/08	< 10	< 5	< 10		6.9	0	10	50 gulls
7/16/08	< 10	< 10	< 10		7.59	0	5	45 gulls
7/23/08	10	< 10	< 10	< 10	2.78	0	2	200 gulls
7/24/08	< 5	< 10	< 10	< 10	1.02	1.51	0	60 gulls, 30 plovers
7/29/08	20	< 10	< 10		7.13	0	0	40 gulls, 30 plovers
7/31/08	20	< 10	40		9.32	0	14	30 gulls, 20 plovers
8/4/08	< 5	< 10	10	70	4.24	0.67	20	15 gulls, 20 plovers
8/5/08	< 10	10	10		4.63	0	4	30 gulls, 40 plovers
8/11/08	< 10	< 10	< 10		4.58	0	12	150 gulls
8/13/08	< 10	< 10	< 10		7.58	0.01	25	20 gulls, 10 plovers
8/20/08	< 10	< 10	< 10		4.98	0	4	60 gulls, 10 plovers
8/21/08	< 10	< 10	< 10	20	3.18	0	15	75 gulls, 30 plovers
8/26/08	< 10	< 10	< 10		4.39	0	0	100 gulls, 20 plovers
8/28/08	< 10	< 10	< 10		7.84	0	0	50 gulls, 15 plovers
9/11/08	< 10	< 5	< 10		6.37	0	0	30 gulls
9/18/08	20	< 10	< 10		1.8	0	0	170 gulls, 15 plovers, 3 crows, 1 dog
9/29/08	< 10	< 10	20		10.09	0.31	50	20 plovers, 2 dead seals